

Claims

[c1] **WHAT IS CLAIMED IS:**

1. A flight altering apparatus for a projectile, comprising:
 - a frame member;
 - a plurality of fins each connected to said frame member by a pivot and surrounding said projectile;
 - a caging arrangement to maintain said fins in a stowed condition and operable, when activated, to allow deployment of said fins; and
 - coupling means connecting adjacent ones of said fins to evenly reduce and distribute aerodynamic loads on said fins and pivots when deployed during flight of said projectile.

[c2] 2. Apparatus according to claim 1 which includes:

- a plurality of main fins; and
- a plurality of auxiliary fins, each connected to two adjacent ones of said main fins to present a total fin surface to the airflow, when deployed, which is continuous and extends 360° around said projectile without any voids, so as to provide for maximum braking action.

[c3] 3. Apparatus according to claim 2 wherein:
each said main fin includes side flanges;

each said side flange includes a slot;
each said auxiliary fin includes side flanges;
each said side flange of said auxiliary fin fitting through
said slot in said side flange of an adjacent one of said
main fins.

- [c4] 4. Apparatus according to claim 2 which includes:
a plurality of spring members, each connected to a main
fin for assisting in the deployment of said main fin after
said caging arrangement is activated to allow deploy-
ment of said fins.
- [c5] 5. Apparatus according to claim 1 wherein:
said caging arrangement includes a single wire passing
through all of said main fins.
- [c6] 6. Apparatus according to claim 1 wherein:
each said fin has a triangular central segment and first
and second triangular fin segments contiguous with said
triangular central segment and pivotable about said cen-
tral segment along first and second hinge lines.
- [c7] 7. Apparatus according to claim 6 wherein:
said caging arrangement includes a first wire connected
to all said first fin segments and a second wire con-
nected to all said second fin segments for independently
deploying said first fin segments and said second fin

segments.

- [c8] 8. Apparatus according to claim 7 wherein:
said caging arrangement additionally includes a third
wire connected to all said central segments.
- [c9] 9. Apparatus according to claim 6 wherein:
said coupling means is a wire connecting adjacent ones
of said fins.
- [c10] 10. Apparatus according to claim 7 which includes:
a spring member attached to an end of said fin to assist
in deployment of said first fin segment or said second fin
segment.
- [c11] 11. Apparatus according to claim 6 which includes
a plurality of spring members, each connected to a fin
for assisting in the deployment of said fin after said
caging arrangement is activated to allow deployment of
said fins.
- [c12] 12. Apparatus according to claim 6 wherein:
said frame is circular;
four of said fins are provided on said frame, two of said
fins being diametrically opposed along a vertical line and
the other two of said fins being diametrically opposed
along a horizontal line;
said caging arrangement being operable to selectively

deploy predetermined combinations of said fin segments.

[c13] 13. Apparatus according to claim 12 which includes:
a plurality of other fins disposed on said frame between
said fins with said fin segments; and
said coupling means is a wire connecting adjacent ones
of said fins.

[c14] 14. Apparatus according to claim 1 wherein:
each said fin has first and second edges and a preformed
concave surface between said edges, adjacent an end
thereof;
said caging arrangement is operable to deform said fin
to a convex orientation which is essentially conformal to
said frame member;
said caging arrangement being operable, when activated,
to selectively release said first or said second edge to its
preformed condition; and
said coupling means is a wire connecting adjacent ones
of said fins.

[c15] 15. Apparatus according to claim 14 which includes:
a plurality of spring members, each connected to a fin
for assisting in the deployment of said fin after said
caging arrangement is activated to allow deployment of
said fins.

